

Notes on species of *Spirama* GUENEE of Japan,  
with remarks for the classification of the genus  
(Lepidoptera, Noctuidae, Catocalinae)

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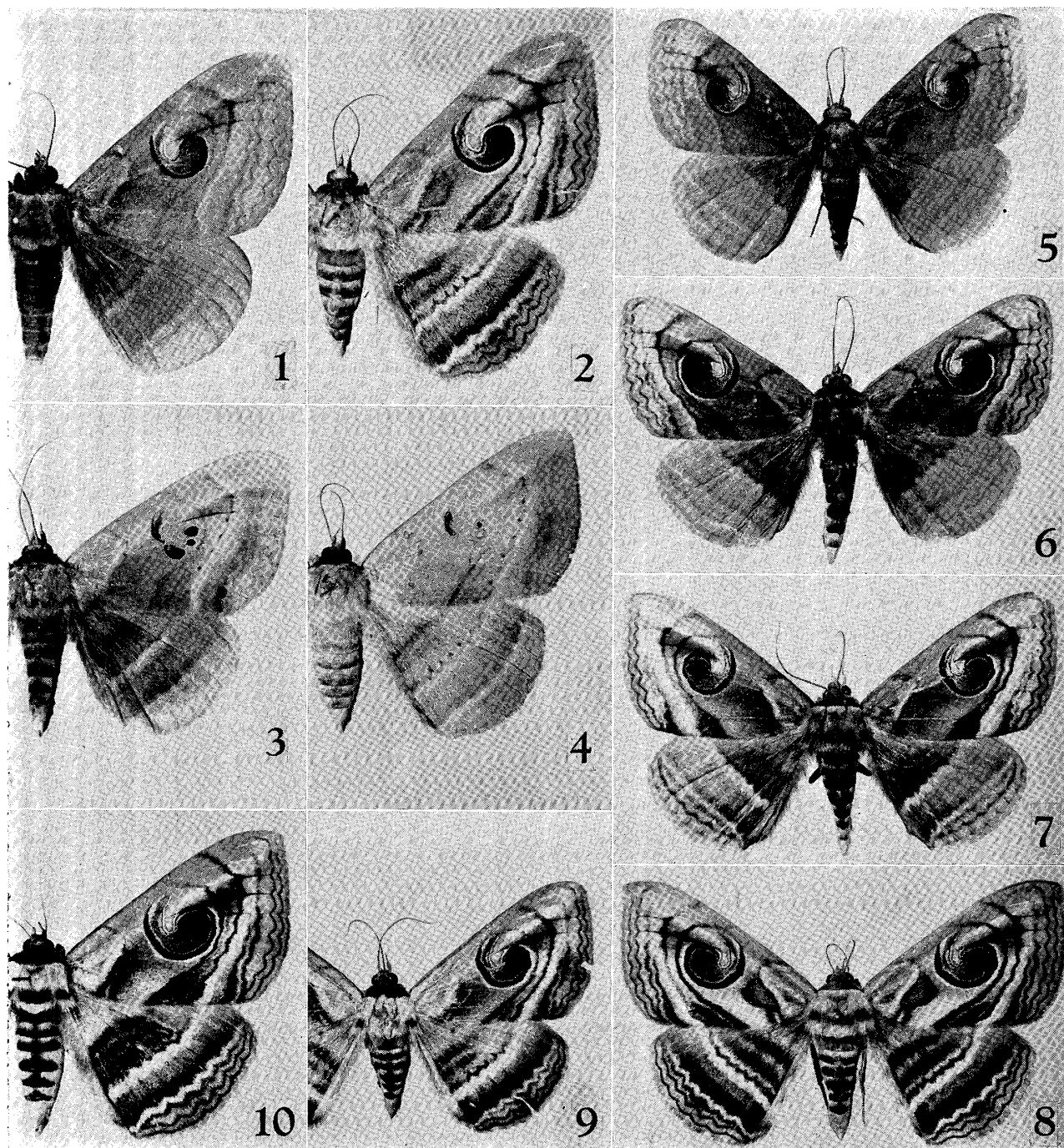
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Before entering the discussion of the heading subject, a nomenclatorial problem must be noted to definite the use of the names *Spirama retorta* (CLERCK, 1759) and *S. helicina* (HUBNER, [1827-1831]) in this paper. These names are used here in the sense of WARREN (1913, in SEITZ, *Macrolep. World*, **3**:325), who gives fine illustration of the moths of this genus (as *Speiredonia*) found in the Palaearctic Region, and whose figures are well representing the both sexes of the Japanese populations discussing below. HAMPSON (1913, *Cat. Lep. Phal. B. M.*, **12**:346-362) differs not only in application of these names, but confused partly in combination of the both sexes of each species. Speaking of the female, the moth he called *retorta* is apparently the same as WARREN's *helicina* and the name *suffumosa* GUENEE, 1852, takes the place of WARREN's *retorta*. Only for the clarity of the definition of species I followed here WARREN, and my treatment is therefore not based upon a result of any bibliographic work for exact interpretation of the names involved.

The moths of the genus *Spirama* GUENEE, 1852 (= *Speiredonia* auct.), are rather common in the lowlands of Japan. They are usually treated as representing four species there, viz. *retorta* CLERCK, *helicina* HUBNER, *martha* BUTLER and *japonica* GUENEE. However, when a large lot of specimens of the both sexes are studied, some difficulties are often experienced to divide them into the four, as the superficial characters in some cases intergrade, especially between the males of *retorta* and *helicina*, or between the females of *helicina* and *japonica*. The ill-marked *martha* is the only species with isolated appearance never intergrading to any of the other species. The establishment of a more definite basis for grouping them is thus hoped, but my attempt to do it by examining the male genitalia was not resulted in a conclusion enough, mainly because of their egative features among species.

In the years 1958 to 1959, my little observations were made during various seasons in a place where the moths of this genus are fairly abundant. My attention was called at first to a fact that the moths captured in May to June are all referable to *martha* or *japonica*, though the latter being associated with a few females confusingly alike to those of *helicina*. The other species, *retorta* and *helicina*, appeared in the same place exactly later in the end of July towards August. Then I have a thought that the moths called *japonica* are nothing other than the spring brood of *helicina*, and hence, that the matter would be parallel in the case between *martha* and *retorta*, in spite of their serious dissimilarity of the wing pattern. I have briefly stated this possibility in my work illustrating Japanese moths (1959, in: *Icon. Ins. Jap. Col. nat. ed.*, **1**:145), suggesting a future solution by breeding experiments.

A while later, in 1962, Mr. Y. YAMAMOTO, Ikeda, had a good success in rearing larvae from ova deposited by female adults of the couple of species. The results satisfactorily proved the

Japanese species of the genus *Spirama* (in natural size)Figs. 1-4 *Spirama retorta* (CLERCK)

1. Summer brood male (August). 2. Summer brood female (August). 3. Spring brood male (=martha) (June). 4. Spring brood female (=martha) (June).

Figs. 5-10 *Spirama helicina* (HUBNER)

5. Summer brood male (August). 6. Spring brood male (Intermediate form) (July). 7. Spring brood male (=japonica) (May). 8. Summer brood female (July). 9. Spring brood female (May). 10. Spring brood female (June).

All the specimens figured here were collected by me on the stated months of the years 1958-1959, at Odaru Spa, in the southern part of Izu peninsula, Shizuoka Pref.

relationships that I had assumed, and he has kindly informed me of that in every stages the structural differences can be hardly seen between them under microscope, apart from very slight and rather obscure features in the dorsal fine stripes on the skin of larvae. The detailed descriptions of larvae of the both species have been recently published by him with coloured illustration (YAMAMOTO, 1966, in: Early stages of Japanese Moths in colour, 1:130-132, pl. 44, figs. 137, 138).

The both species have roughly the same life-cycle in Japan. They feed exclusively on the leaves of *Albizia Julibrissin* DURAZZ. (Leguminosae), a commonest wild tree widely distributed throughout the lowlands south of Honshu. Overwintering in pupal stage, the moths of the first brood, representing the vernal form, appear in May to June, and the mature larvae are found in July, then producing the second brood moths in middle of summer. When the larvae found in September are reared in laboratory, unusual third brood occurs frequently in autumn which has the same appearance as the typical or aestival form. This seems to show that in the tropics the typical form may be dominant throughout a year.

We have now the two distinct species of the genus *Spirama* in Japan. The synonymies will be as follows, and the male genitalia of the both species are illustrated (Figs. 11, 12).

*Spirama retorta* (CLERCK, 1759) = *Spirama martha* BUTLER, 1878.

*Spirama helicina* (HUBNER, (1827-1831)) = *Spirama japonica* GUENEE, 1852.

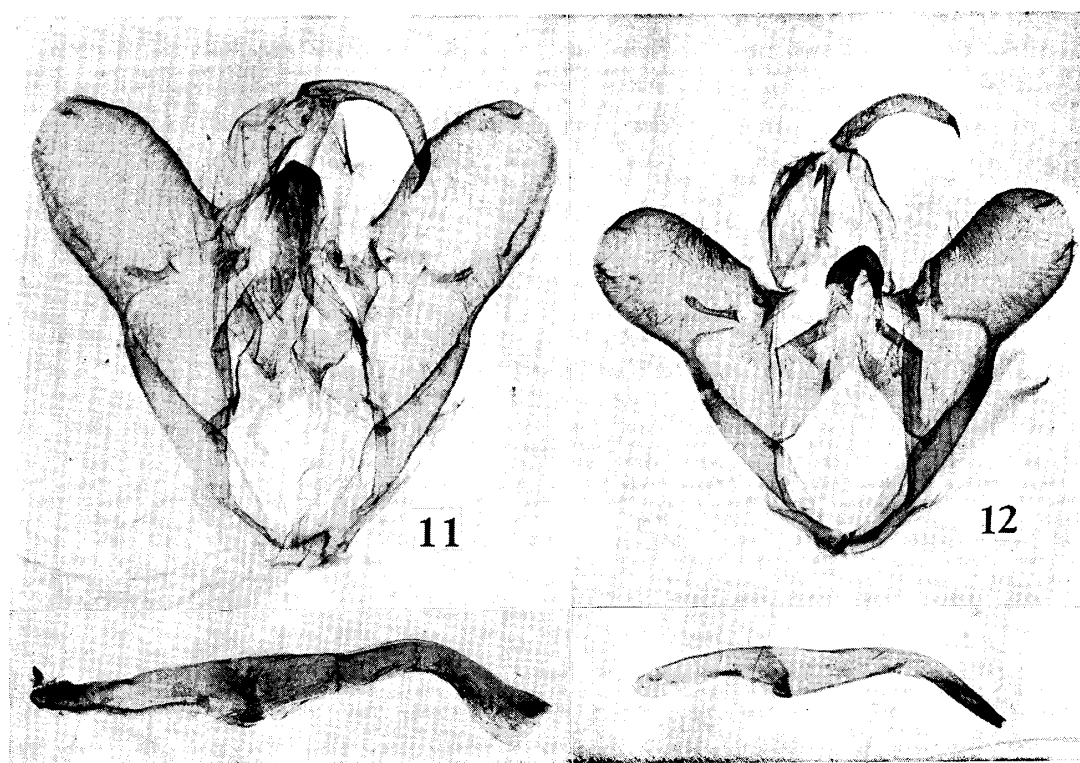
The fact revealed will open a way to analyse the whole of the *Spirama*-complex. For the first, it must be pointed out that in the two closely related species the differentiation of wing pattern towards the vernal form takes place in their respective way, resulting in occurrence of a couple of extremely dissimilar moths. In one species, *helicina*, the male of spring brood has the wings more brownish and more distinctly marked than of summer brood that are uniformly dark black brown, with the outer postmedian line more or less shaded with whitish exteriorly and the white stria from below apex towards the upper edge of discoidal mark distinct as in female; the underside of wings usually suffused with crimson. In the female differences are scarce between the two broods. In the other species, *retorta*, the modification in the spring brood is very striking, as it does not show the sexual distinctions as usual in most cases of the genus. It has in the both sexes the ground colour of the wings uniformly ochreous grey to ochreous brown, tinged with olivaceous or rosy, with transverse lines much obsolescent, the comma-shaped discoidal spot reduced into a few black points or nearly completely missing. The underside of wings is suffused with crimson in the both sexes.

The second important feature is that the occurrence of such vernal forms seems limited to the north temperate areas of East Asia. Both *martha* and *japonica* have been recorded hitherto from China and Japan, though the species *retorta* and *helicina* are well known as Indian insect, the distribution of the former extending further to the adjacent Indo-Malayan areas. This possibly means that in the climatic conditions of such areas the species produce many broods of the typical or aestival form throughout a year. If it may be true, there remains a question that certain corresponding forms are to be found also in temperate areas such as the northern highlands of India at above some elevations. There seems not to be such forms known to us in literature, but it will be suggested that the Indian form *triloba* GUENEE (or *modesta* MOORE or

*rosacea* HAMPSON), with abbreviated wing markings similar to *martha*, would be a form of *retorta* or otherwise of a "third" species closely related to it. It is in March and May that the moths referred to "*triloba*" by SEMPER (1901, Schmett. Philipp. Inseln, 2: 575) was captured in the Philippines, where he also took the specimens he referred to "*retorta*" in various seasons.

HAMPSON's description of the male of his "*retorta*", perhaps prepared from Indian specimens, does not fit with the typical or aestival males of *helicina* before me, but it seems to denote a form nearest to the male of *japonica* from Japan. The summer brood male of *helicina* is hardly separable from that of *retorta* except its smaller expanse, and in the HAMPSON's key it surely falls into his "*suffumosa*". It is not improbable to assume that HAMPSON wrongly combined the typical males of *helicina* with those of *retorta* under the name of his "*suffumosa*". If it is sure, the male associated by him with the female of his "*retorta*" will be an Indian representative of *japonica*, a seasonal form of *helicina*.

Finally the above-mentioned things will give us an unnoticed standpoint to approach an exact reclassification of the whole genus. Apart from the two African species, which are structurally distinct from the Indo-Malayans, the moths of the genus are widely distributed in almost all the region of the tropical and subtropical Asia, south-eastwards through New Guinea to North Australia. The group appears to be a very difficult complex, as species have basically similar and somewhat individually variable wing markings. The difficulty is increased by the sexual dimorphism appearing in most of them. HAMPSON states that they "grade into one another and



Male genitalia of the genus *Spirama*

Fig. 11 *Spirama retorta* (CLERCK) f. *martha* BUTLER (Prep. No. SS-537).

Fig. 12 *Spirama helicina* (HUBNER) f. *japonica* GUENEE (Prep. No. SS-538).

might equally well be treated as all more or less localized forms of one species". He recognized twelve species in his Catalogue, but the majority of his species are representing rather endemic population to various parts of the Indo-Malayan region. His stating is, as at present understood, not sufficiently correct, as it cannot be regarded as one species. I think, however, that it will be yet probable that the group would actually consist of a very few, but not less than two, species with wide distribution and with considerable variations, local or seasonal.

A key to the various forms of Japanese *Spirama* will be appended below.

#### A KEY TO SPECIES OF *SPIRAMA*, BASED ON JAPANESE SPECIMENS

1. — The discoidal mark complete ..... 2
  - The discoidal mark obsolescent, or represented by a few black points on it  
..... *retorta*, spring brood (= *martha*)
2. — Male (♂) ..... 3
  - Female (♀) ..... 6
3. — Forewing much suffused with red brown, the outer postmedian line shaded with whitish  
outsides, with more or less distinct whitish stria from below apex towards the upper edge of  
the discoidal mark, which is larger ..... 4
  - Forewing uniformly dark black brown, the outer postmedian line not shaded with whitish,  
without whitish stria from below apex towards the upper edge of the discoidal mark, which  
is smaller ..... 5
4. — Underside of wings more or less tinged with crimson; on upperside of hindwing the median  
dentate line shaded with whitish outside, and subterminal wavy line distinct and pale  
..... *helicina*, spring brood (= *japonica*)
  - Underside of wings somewhat pale but scarcely tinged with crimson; on upperside of hindwing  
the median dentate line not shaded with whitish, and subterminal wavy line indistinct  
..... *helicina*, spring brood (intermediate form)
5. — Expanse smaller; the subterminal area of hindwing usually pale  
..... *helicina*, summer brood <sup>1)</sup>
  - Expanse larger; the subterminal area of hindwing usually not pale  
..... *retorta*, summer brood <sup>1)</sup>
6. — Hindwing with pale subterminal line distinctly dentate  
..... *helicina*, spring and summer brood
  - Hindwing with pale subterminal line more or less diffuse, straightish or less dentate  
..... *retorta*, summer brood

In concluding this paper I must express my deep gratitude to Mr. YOSHIMARU YAMAMOTO for his valuable advices from his successful experiments, which made me possible to prepare this manuscript.

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1) The key will be not always applicable for separating these forms.

## 摘 要

日本産のトモエガのなかま *Spirama* GUENEE, 1852 は、最近まで4種に分類されていたが、山本義丸(1966, 原色日本蛾類幼虫図鑑, 1: 130-132, pl. 44) が累代飼育に成功し、かつて私(1959, 原色昆虫大図鑑, 1: 145) が推定したように、それらは2種に整理され、他の2種はそれぞれの春型を代表するものであることが判明した。学名及び和名を次のとおり整理する。

*Spirama retorta* (CLERCK, 1759) = *Spirama martha* BUTLER, 1878. オスグロトモエ (アカイロトモエ)  
*Spirama helicina* (HUBNER, [1827-1831]) = *Spirama japonica* GUENEE, 1852. ハグルマトモエ (ヤマトトモエ)

もっとも古い種名 *retorta* の適用には、従来著者によって解釈の相違があるが、ここでは私(1959)の取扱いと同じく、WARREN (1913) に従った。その理由は本文中に記したが、本稿の論議とは別に、これらの命名上の問題は将来解決が必要である。

以上の結果として次の事実が指摘される。

1. 種 *retorta* 及び *helicina* は、基本型(日本における夏型)では、顕著な雌雄異型を示し、かつ両性とも両種は互に酷似し、雄では時に区別しがたいほどである。しかし春型では、両種は全く異なる方向に変化し、特に *retorta* では基本型との相違がいちじるしく、かつ雌雄同型となる。

2. 両種における春型の発現は、日本、中国などの温帯地域に限定されているらしく、このことは、アジアの熱帯ないし亜熱帯地域では両種とも年間を通じ基本型のみを生産することを意味するものと考えられる。インド北部の高地などでは、同様の、または別型の春型を生ずることが推測されるが、文献上ではそれらの存在を明確にし得ない。ただしインド産の *triloba* GUENEE (*modesta* MOORE, *rosacea* HAMPSON) は明かに日本のアカイロトモエと同様な斑紋型を示し、それらは *retorta* もしくはその他の種の季節型を代表するものと想像される。また HAMPSON (1913) が、“*retorta*”として記載しているものは、雌はハグルマトモエであるが、雄はここで扱うハグルマトモエの基本型の雄と一致せず、むしろ日本産のハグルマトモエの春型の雄に近いものである。HAMPSONの検索表では、オスグロトモエ及びハグルマトモエの基本型の雄は分離できず、HAMPSON がそれらを一種として、ここで扱うオスグロトモエの雌と結合し、それを種“*suffumosa*”として扱っていることはほぼ確実である。

3. 両種における季節型の存在と、その斑紋の変化様式ないし変化の極限が明かになったことは、この属の世界的な分類に一つの基礎を与えるものである。属 *Spirama* はインド全域からセイロン、ビルマ、インドシナ、中国、台湾、朝鮮を経て日本まで北上し、ジャワ、スマトラ、セレベス、フィリピン、ニューギニアなどの諸島とオーストラリア北部にわたる熱帯アジアの全域に分布し、約30個の種名が命名されている。HAMPSON はこれらを12種に統合したが、彼自身も述べているように、これらは将来多くの地理的、季節的変異をとまなう2ないし少数の種に還元されるべき可能性をもつものである。

本文中には触れてないが、日本国内の属 *Spirama* の分布について一言すれば、本属の2種は、本州、四国、九州の低地には、ひろく分布しているものと思われるが、もう一度再点検が必要である。特に東北地方の調査は、両種の分布密度、北限等に差があるかどうかを知る上で重要である。北海道では特に道南地域に本属が土着しているかどうか、またどちらの種が採集されるかについての調査が必要であるが、これまでなんの資料も発表されていない。琉球列島では、西表島産の *helicina* の標本(春型および夏型)が今私の手許にあるほか、全く記録を欠く。沖縄本島には本属の蛾は産しないようであるが、やはり調査が必要であろう。